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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/471,981	12/23/1999	EMIKO IGAKI	MTS-3181US	8182

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ALLAN RATNER  
RATNER & PRESTIA  
SUITE 301 ONEW WESTLAKES BERWYN  
P O BOX 980  
VALLEY FORGE, PA 194820980

EXAMINER

TRAN, LY T

ART UNIT

PAPER NUMBER

2853

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Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/471,981

Applicant(s)

IGAKI ET AL.

Examiner

Ly T TRAN

Art Unit

2853

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 November 2002.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,3-5,39-63,65-69 and 71-82 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1,4,5,40,41,43,51,53,54,56,65-69,72,75 and 77-80 is/are allowed.
- 6) ☒ Claim(s) 3,39,42,44-50,58,61-63,71,76,81-82 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)                      4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)                      5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_                      6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 3, 44, 58, 61-63, 71, 76 and 81 are rejected under 35 U.S.C.

103(a) as being unpatentable over Sugahara (USPN 5,631,680) in view of Tsukada et al. (USPN 6,097,412) and Watanabe et al (WO 0071345))

Sugahara discloses (Figs. 4) an ink-jet recording head comprising at least one piezoelectric block (B). Each piezoelectric block (B) has first and second ink pressure chambers 112 each pressure chamber communicating with a nozzle (Fig. 3: element 12), first and second partition walls (111A, 111B), each partition wall serving as a driving portion for one of the ink pressure chambers, each partition wall including a piezoelectric element and two electrodes (117, 113A)) for driving said piezoelectric element, a pressure buffer chamber (116), and first and second fixed walls (Fig.4). The first fixed wall, the first ink pressure chamber, the first partition wall, the pressure buffer chamber, the second partition wall, the second ink pressure chamber, and the second fixed wall are arranged in sequence along a thickness direction (Fig.4) and surface of the electrodes are oriented perpendicular to the thickness direction, the driving portion is polarized in the thickness direction and perpendicular to the surfaces of the

electrodes (Fig.4), at least one electrode for controlling, by bending of the electrode, whether the partition wall bend toward a side of the ink pressure chamber or bends towards a side of the pressure buffer chamber (Fig.4)

With respect to claim 44, shown in Fig.4 a plurality of these blocks, arranged in the thickness direction.

With respect to claim 58, the pressure buffer chambers are all closed on a side at which the nozzle communicating with the ink pressure chamber is open (see Fig. 4).

With respect to claims 61-64, there are exactly two electrodes per partition wall, one of which is exposed to the pressure buffer and the other exposed to the ink pressure chamber. With respect to claim 71, a portion at which the electrodes on a partition wall face each other is included in a portion at which the ink pressure chamber and pressure buffer chamber face each other (Figs. 4) With respect to claim 76, the distance between nozzles appears to be constant (Fig.4).

However, Sugahara. fails to teach the piezoelectric block is an integrally sintered one piece block structure and at least one of the electrodes is embedded in the wall.

Tsukada et al. teaches the piezoelectric block is an integrally sintered one piece block structure (Column 3: line 6-7).

Watanabe et al teaches at least one of the electrodes is embedded in the wall (Fig.1: element 24, 25).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of Sugahara. with the piezoelectric block is an integrally sintered one piece block structure as taught by Tsukada et al. The motivation

of doing so is in order to reduce production cost of the piezoelectric device (Tsukada USPN 6,097,412; Column 3: line 9-12).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of Sugahara with one of the electrodes is embedded in the partition wall as taught by Watanabe. The motivation of doing so is in order to conduct electrical power to bend the wall.

2. Claims 39, 42, and 46-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugahara (USPN 5,631,680) in view of Tsukada et al (USPN 6,097,412) and Watanabe et al (WO 0071345)

Sugahara discloses an invention of the type claimed, except for its method of manufacture.

Regardless of the method of production, the product is disclosed by Sugahara. These limitations added by claims 39, 42, and 46-50 are limitations on how the recording head is produced. Thus, these claims are product-by-process claims (See MPEP §2113).

"[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985)

3. Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sugahara (USPN 5,631,680) in view of Tsukada et al (USPN 6,097,412) and Watanabe et al (WO 0071345) as applied to claim 3 above, further in view of Kishi (US 6095641 A).

The combination of Sugahara, Tsukasa et al and Watanabe discloses an invention of the type claimed. However, Sugahara, Watanabe and Tsukasa et al fail to teach that piezoelectric blocks (B) are not repeatedly arranged in a direction perpendicular to the thickness direction.

Kishi teaches (Fig. 1; column 2, lines 1-4) that one would stack piezoelectric blocks in a direction perpendicular to the thickness direction. Kishi suggests that this method is commonly used to allow for color printing.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combined invention of Sugahara, Tsukasa et al and Watanabe to incorporate the teaching of Kishi. One would have been motivated to make such a modification by the suggestion of Kishi that it is commonly used to allow for color printing.

#### ***Allowable Subject Matter***

4. Claims 1, 4, 5, 40, 41, 43, 51, 53, 54 and 56 are allowed.

The primary reason for the allowance of claims 1, 4, 5, 40, 41, 43, 51, 53, 54 and 56 is the inclusion of the limitation in claims 1 and 4 of one of the fixed

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walls to be disposed adjacent to the ink pressure chamber and another of the fixed walls to be disposed adjacent to the pressure buffer chamber. It is this limitation found in each of the claims, as it is claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

5. Claims 52, 55, 57, 60, 59, 65-69, and 72-75, 77-80 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 52 is allowable over the prior art of record because a t least prior art has not been found to anticipate a length of the fixed walls in the thickness direction is greater than that of the partition walls in the thickness direction.

Claim 55 is allowable over the prior art of record because a t least prior art has not been found to anticipate each of the fixed walls includes a portion firmer than the partition wall.

Claim 57 is allowable over the prior art of record because a t least prior art has not been found to anticipate each of fixed walls includes a hollow portion. Claim 60 is over the prior art of record because a t least prior art has not been found to anticipate each of electrodes has a mesh-like structure.

Claim 59 is allowable over the prior art of record because a t least prior art has not been found to anticipate the pressure buffer chamber to communicate with an air inlet/outlet path connected outside of the recording head.

Claims 65-67 are allowable over the prior art of record because at least prior art has not been found to anticipate both electrodes to be embedded inside the partition wall.

Claim 68 is allowable over the prior art of record because at least prior art has not been found to anticipate at least one electrode to be further disposed between the two electrodes.

Claims 69 is allowable over the prior art of record because at least prior art has not been found to anticipate the electrode at the surface exposed to the ink pressure chamber.

Claim 72 is allowable over the prior art of record because at least prior art has not been found to anticipate a length of one of the electrodes in a direction perpendicular to the thickness direction to be different from a length of the other electrode adjacent to said one electrode in the same direction.

Claim 75 is allowable over the prior art of record because at least prior art has not been found to anticipate a length of the ink pressure chamber in a direction perpendicular to the thickness direction to be different from a length of the pressure buffer chamber in the same direction.

Claims 77-80 are allowable over the prior art of record because at least prior art has not been found to anticipate nozzles are aligned without any overlapping in the direction perpendicular to the moving direction, and  $X=P/m$

Wherein X presents a deviation between the nozzles nearest each other out of the nozzles in reference to the moving direction, m presents an integer number of



nozzles, and P presents a distance between the nozzles belonging to the same nozzles alignment.

### ***Response to Arguments***

6. Applicant's arguments with respect to claims 3 and 81 have been considered but are moot in view of the new ground(s) of rejection.

The new limitation "at least one of said electrodes is embedded in said partition wall" is recited in claims 3 and 81 are now rejected over Watanabe (WO 0071345)

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ly T TRAN whose telephone number is 703-308-0752. The examiner can normally be reached on M-F (7:30am-5pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on 703-308-3126. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0967.



January 10, 2003



**ANH T.N. VO**  
**PRIMARY EXAMINER**

01/10/03